

REMARKS

Status of the Claims:

Claims 1 – 33 are currently pending.

Claims 19 – 31 are currently rejected.

Claims 19 – 27 and 29 – 31 are rejected under 35 U.S.C. § 103(a).

Claims 19, 23 and 28 are provisionally rejected for non-statutory obviousness-type double patenting.

Claims 1 – 18, 32 and 33 are allowed.

Claim 28 is allowable but depends from a rejected base claim.

Claims 1, 4 – 6, 16, 18, 19, 22, 26, 29, 30 and 33 are currently amended.

Claims 34 – 36 are new.

Amendments to the Claims:

No new matter has been introduced by way of the claim amendments.

Amendments to the Independent Claims

Claim 1 is presently amended in step a) iii) for purposes of antecedent clarity.

Claim 19 is presently amended in step a) i) to recite that the fluorinated carbon nanotubes comprise fluorine moieties bonded to the carbon nanotubes. This amendment provides antecedent support for an element later in the claim. Support can be found in at least structure 1 of the instant specification. Claim 19 is also amended in step b) to recite that a portion of the fluorine moieties are displaced to yield functionalized carbon nanotubes comprising hydroxyl-terminated moieties attached to their sidewalls and residual fluorine moieties. Support that only a portion of the fluorine moieties are displaced and the functionalized carbon nanotubes contain residual fluorine may be found in at least paragraphs [0046] and [0054] of the instant specification. Claim 19 is also amended in the preamble to correct a minor grammatical error.

Claim 29 is presently amended to add element b), 'a quantity of fluorine moieties bonded to the carbon nanotubes'. Support that the functionalized carbon nanotubes comprise a quantity of fluorine moieties bonded to the carbon nanotubes may be found in at least paragraphs [0046] and [0054] of the instant specification.

Amendments to the Dependent Claims

Claim 4 is presently amended for purposes of clearer antecedent agreement.

Claim 5 is presently amended for stylistic purposes.

Claim 6 is presently amended for purposes of clearer antecedent agreement.

Claim 16 is presently amended for stylistic purposes.

Claim 18 is presently amended to depend from independent claim 13, instead of from independent claim 1.

Claim 22 is presently amended for stylistic purposes.

Claim 26 is presently amended for clarity and stylistic purposes.

Claim 30 is presently amended for stylistic purposes.

Claim 33 is presently amended for stylistic purposes.

New Claims

New claim 34 is supported by at least paragraph [0040] of the instant specification.

New claim 35 is supported by at least paragraph [0046] of the instant specification.

New claim 36 is supported by at least paragraph [0046] of the instant specification.

I. Rejection of Claims 19 – 27 and 29 – 31 Under 35 U.S.C. § 102(b)/103(a)

Claims 19 – 27 and 29 – 31 stand rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(c) obvious over PCT publication WO96/18059

(hereinafter, *Fisher*). Office Action page 2. Applicants respectfully traverse the rejection of these claims.

I.1 Standard of Review

The standard of review for establishing anticipation under 35 U.S.C. § 102 is set forth as follows: "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP § 2131.

For rejections made under 35 U.S.C. § 103(a), all claim limitations must be taught or suggested by the prior art to establish obviousness. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). Furthermore, "[r]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness". *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007) citing with approval *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006). In issuing rejections under 35 U.S.C. § 103(a), the Examiner must consider an invention and the prior art as a whole in accordance with the requisite *Graham* factual inquiries. M.P.E.P. § 2141; *Ruiz v. A.B. Chance Co.* 69 U.S.P.Q.2d 1686, 1690 (Fed. Cir. 2004). Furthermore, "[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." MPEP § 2141.02; *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

I.2 Examiner's Grounds of Rejection

The Examiner alleges that *Fisher* teaches functionalized nanotubes of formula $[C_nH_L]_m A_m$, wherein A can be OY and Y can be R'OH. The Examiner simplifies the formula taught by *Fisher* to $[C_nH_L]_m OR'OH$, which the Examiner interprets to be similar to the structure implied by the process steps of the claims. The Examiner alleges that *Fisher* also teaches surface carbon modification, wall substitution, and edge carbon substitution. The Examiner alleges that the remaining rejected claims are obvious in view of *Fisher*, since it would have been obvious to use

a combination of substitutions of various R' groups. The Examiner alleges that *Fisher* teaches that R' can be aryl or other organic groups.

1.3 Claims 19 – 27 Are Not Anticipated By or Obvious In View of Fisher

Applicants respectfully assert that claim 19, as presently amended, is not anticipated by or obvious in view of *Fisher*. In particular, Applicants have amended claim 19 to include a limitation of the process that a portion of the fluorine moieties are displaced to yield functionalized carbon nanotubes having i) hydroxyl-terminated moieties attached to their sidewalls and ii) residual fluorine moieties. In other words, the functionalized carbon nanotubes of claim 19 are non-uniformly substituted. Applicants respectfully assert that *Fisher* does not teach, either expressly or inherently, functionalized carbon nanotubes having both hydroxyl-terminated moieties attached to sidewalls and residual fluorine moieties. Hence, claim 19 is not anticipated by *Fisher*.

Although *Fisher* may teach functionalized carbon nanotubes that are non-uniformly substituted having the formula $[C_nH_l]R_m$ (see *Fisher*, page 8, lines 11 – 17), *Fisher* does not teach that functionalized carbon nanotubes having the formula $[C_nH_l]A_m$, particularly $[C_nH_l]OR'OH$, can be non-uniformly substituted. Furthermore, *Fisher* does not suggest a non-uniformly substituted carbon nanotube composition having the formula $[C_nH_l]OR'OH$. In fact, *Fisher* expressly teaches away from such a non-uniformly substituted carbon nanotube composition. For instance, as clearly stated in *Fisher* on page 8, lines 12 – 16, for non-uniformly substituted compositions of formula $[C_nH_l]R_m$, each of R does not contain oxygen. Since the functionalized carbon nanotubes of Applicants' claim 19 do contain oxygen in their hydroxyl-terminated moieties, there is no suggestion by *Fisher* to prepare functionalized carbon nanotubes that are non-uniformly substituted with both hydroxyl-terminated moieties attached to their sidewalls and residual fluorine moieties.

In view of the foregoing remarks and amendments, Applicants respectfully assert that claim 19 is not anticipated by or obvious in view of *Fisher*. Claims 20 – 28 depend either directly or indirectly from patentable claim 19 and are not anticipated or obvious for at least the same reasons. Furthermore, new claims 34 and 35 depend directly from claim 19 and are also not anticipated or obvious for at least the same reasons. Therefore, Applicants respectfully

request that the Examiner's rejection of claims 19 – 27 under 35 U.S.C § 102(b)/103(a) be withdrawn.

1.4 Claims 29 – 31 Are Not Anticipated By or Obvious In View of Fisher

Applicants respectfully assert that claim 29, as presently amended, is not anticipated by or obvious in view of *Fisher*. In particular, Applicants have amended claim 29 to include a further limitation that the functionalized carbon nanotubes also comprise a quantity of fluorine moieties bonded to the carbon nanotubes. In other words, the functionalized carbon nanotubes of claim 29 are non-uniformly substituted. Applicants respectfully assert that *Fisher* does not teach, either expressly or inherently, functionalized carbon nanotubes including both a) $-OR(OH)_m$ functional groups attached to their sidewalls and b) a quantity of bonded fluorine moieties. Hence, claim 29 is not anticipated by *Fisher*.

Although *Fisher* may teach functionalized carbon nanotubes that are non-uniformly substituted having the formula $[C_nH_l]R_m$ (see *Fisher*, page 8, lines 11 – 17), *Fisher* does not teach that functionalized carbon nanotubes having the formula $[C_nH_l]A_m$, particularly $[C_nH_l]OR'OH$, can be non-uniformly substituted. Furthermore, *Fisher* does not suggest a non-uniformly substituted carbon nanotube composition having the formula $[C_nH_l]OR'OH$. In fact, *Fisher* expressly teaches away from such a non-uniformly substituted carbon nanotube composition. For instance, as clearly stated in *Fisher* on page 8, lines 12 – 16, for non-uniformly substituted compositions of formula $[C_nH_l]R_m$, each of R does not contain oxygen. Since the functionalized carbon nanotubes of Applicants' claim 29 do contain oxygen in their $-OR(OH)_m$ functional groups, there is no suggestion by *Fisher* to prepare functionalized carbon nanotubes that are non-uniformly substituted with both $-OR(OH)_m$ functional groups and a quantity of bonded fluorine moieties.

In view of the foregoing remarks and amendments, Applicants respectfully assert that claim 29 is not anticipated by or obvious in view of *Fisher*. Claims 30 and 31 depend either directly or indirectly from patentable claim 29 and are not anticipated or obvious for at least the same reasons. New claim 36 depends directly from claim 29 and is also not anticipated or obvious for at least the same reasons. Therefore, Applicants respectfully request that the Examiner's rejection of claims 29 – 31 under 35 U.S.C § 102(b)/103(a) be withdrawn.

II. Double Patenting Rejection

Claims 19, 23 and 28 stand rejected on the grounds of non-statutory obviousness-type double patenting as being unpatentable over claims 66, 68, 69 and 67, respectively, of co-pending Application No. 10/559,905 (hereinafter, the '905 application). Office Action page 4. Applicants respectfully traverse the provisional non-statutory obviousness-type double patenting rejection for at least the reasons set forth hereinbelow.

The instant application is a 371(c) national stage entry of PCT Application PCT/US04/19015, filed June 16, 2004, which claims priority to United States provisional patent applications 60/478,936, filed June 16, 2003, and 60/490,556, filed July 28, 2003. Hence, the instant application has an earliest effective filing date of June 16, 2003.

The '905 application is a 371(c) national stage entry of PCT Application PCT/US04/19188, filed June 16, 2004, which claims priority to United States provisional patent applications 60/478,936, filed June 16, 2003, and 60/490,556, filed July 28, 2003. Hence, the '905 application also has an earliest effective filing date of June 16, 2003.

As recited in M.P.E.P. § 804.I.1, "[i]f 'provisional' (ODP) rejections in two applications are the only rejections remaining in those two applications, the examiner should withdraw the ODP rejection in the earlier filed application thereby permitting that application to issue without need of a terminal disclaimer.... If both applications are filed on the same day, the examiner should determine which application claims the base invention and which application claims the improvement (added limitations). The ODP rejection in the base application can be withdrawn without a terminal disclaimer, while the ODP rejection in the improvement application cannot be withdrawn without a terminal disclaimer."

Applicants respectfully assert that in view of the amendments to instant claim 19, the non-statutory obviousness-type double patenting rejection should be considered moot. In particular, the cited claims of the '905 application are not directed to functionalized carbon nanotubes that include both hydroxyl-terminated moieties attached to their sidewalls and residual fluorine moieties.

In view of the foregoing remarks, Applicants respectfully request that the non-statutory

obviousness-type double patenting rejection be withdrawn. However, should the Examiner maintain the non-statutory obviousness-type double patenting rejection, Applicants respectfully request that the Examiner make a determination of which application claims the base invention and which application claims the improvement as required by M.P.E.P. § 804.I.1.

III. Allowable Subject Matter

Claims 1 – 18, 32 and 33 are allowed. Applicants acknowledge the Examiner's allowance of these claims.

Applicants note that although the Examiner has indicated that *Fisher* does not teach the embodiments of claim 28, the Examiner has not formally objected to this claim as being dependent from a rejected base claim. However, Applicants respectfully assert that in view of the amendments to claim 19, from which claim 28 indirectly depends, such objection should be considered moot.

CONCLUSIONS

Claims 1 – 36 remain pending in the application. Applicants respectfully assert that the double-patenting rejection now remains the only outstanding rejection in the application, and claims 1 – 36, as presently amended, are otherwise in a condition for allowance.

If additional fees are due and are not included, the Director is hereby authorized to charge any fees or credit any overpayment to Deposit Account Number 23-2426 of Winstead PC (referencing matter 11321-P073WOUS).

If the Examiner has any questions or comments concerning this paper or the present application in general, the Examiner is invited to call the undersigned at 713-650-2782.

Respectfully submitted,

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